OMICRON

TEST UNIVERSE

World Leader in Innovative Power System Testing Solutions

PRIMARY TESTING

CP-LINE CATALOG

Company Profile

CUSTOMER AND COMPANY PROFILE

About our customers

Typical customers of our CP product line, which represents our products for primary testing, are engineers and technicians working mainly in commissioning, maintenance testing, and test fields of

- Power transformers,
- Current transformers,
- Voltage transformers,
- Circuit breakers,

and other electrical power system equipment in utilities and industry.

Our test equipment is also used for automated measuring of resistances (contact resistances, winding resistances, grounding resistances, cable impedances), power factor, dissapation factor, and capacitance, but also for single-phase testing of primary and secondary protective relays (I>, V>, V<, or frequency relays.)

About OMICRON electronics

OMICRON electronics is an international company providing innovative solutions for primary and secondary testing.

Combining innovation, leading edge technology, and creative software solutions, OMICRON's sales have earned world leader status for OMICRON within this niche market. With sales in more than 100 countries, offices in Europe, the United States, and Asia, and a worldwide network of distributors and representatives, OMICRON has truly established its reputation as a supplier of the highest quality.

The automated testing and documentation capabilities of OMICRON testing solutions are important benefits in light of the changing market conditions resulting in restructured organizations required to "do more with less".

Today, OMICRON's products revolve around a testing concept which provides the solutions to many challenges created by these competitive trends in the marketplace. This integration of lightweight and reliable hardware with flexible and user-friendly software is referred to as the OMICRON Test Universe.

Services in the area of consulting, commissioning, relay testing and training make OMICRON´s product range complete.

Specialization in power system testing along with visionary leadership allows OMICRON to continue with innovative developments for its testing solutions to meet the customer needs of the 21st century.

Subjects covered in other catalogs

SECONDARY TESTING - CM line catalog
OMICRON's product range in the area of secondary testing.

For a detailed list on literature currently available, please refer to **www.omicron.at**/support/literature or **www.omicronusa.com**/support/literature.

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ISO 9001 certified

CPC 100

OVERVIEW

Multifunctional Primary Test System for Substation Commissioning and Maintenance

This world-wide unique system allows for automated testing of power transformers, CTs, VTs, resistance testing, and more.

Providing up to 800 A (or 2000 A with current booster) and 2000 V with a frequency range of 10-400 Hz, it also comes complete with an integrated PC. Its software routines test a wide range of substation equipment, and automatically create customizable reports. The compact design (29 kg / 64 lbs) and the innovative software save testing time and minimize transportation costs.

Analog voltages and currents can be measured with very high precision. Its Ω meters offer ranges from μΩ to kΩ to allow for a wide variety of applications. Testing of unconventional equipment, such as Rogowski Coils or current sensors completes the spectrum. Additional aplications can be added with the use of flexible accessories to include tangent delta / power factor testing and primary measurements of power system equipment.

LIGHTWEIGHT
29 kg / 64 lbs
- Less than one fourth the weight of equivalent conventional equipment
- Lower transportation costs saves money
- Easier handling reduces manpower needs
- Low weight reduces injury potential

ONE TEST UNIT FOR MULTIPLE USES
- Replaces need for multiple test sets (e.g. high current and voltage sources, μΩ meter)
- Saves time by eliminating need for multiple training
- User-friendly interface reduces training time to one day

AUTOMATED TESTING AND REPORTING
- Prepare test plans ahead of time in office (saves time in field testing phase)
- Set up test once, push button to start (saves testing time)
- Results automatically saved (saves time and reduces errors by eliminating manual recording of data)
- Automatic report generation (saves time by eliminating manual report writing; accelerates project completion)
- Print reports via external PC

SAFETY FEATURES
- Emergency shut off button
- Safety key lock (block unauthorized use)
- Overvoltage protection on all inputs and outputs

PREPARED FOR THE FUTURE
- Able to test unconventional equipment like Rogowski Coils or current sensors
- Unit accessible in a network or with direct PC connection via standard internet protocols
- Maximum flexibility for future enhancements by using DSPs for signal generation and switched mode amplifier technique

CURRENT TRANSFORMER (CT)
automatic testing of:
- Ratio, burden and polarity
- Phase and magnitude error
- Excitation curve
- Winding resistance
- Secondary burden
- Dielectric withstand voltage (2kV ac)
- CT circuit continuity

VOLTAGE TRANSFORMER (VT)
automatic testing of:
- Ratio and polarity
- Phase and magnitude error
- Secondary burden
- Dielectric withstand voltage (2kV ac)
- VT circuit continuity

POWER TRANSFORMER
- Ratio
- Winding resistance
- Tap changer testing
- Excitation current
- Short-circuit impedance measurement
- Leakage reactance

RESISTANCE TESTING
- Contact resistance (μΩ)
- Winding resistance (μΩ - kΩ)
- Ground resistance
- Measuring of complex impedances (winding impedances, cable impedances, etc.)

PROTECTION RELAYS
- Single phase testing of primary and secondary relays (I>, V>, V<, or frequency relais)

ADDITIONAL APPLICATIONS

- **TANGENT DELTA / POWER FACTOR TEST** Add the CP TD1 accessory for the most flexible insulation diagnosis system in the industry.

- **LINE & GROUND IMPEDANCES, k-FACTOR, MUTUAL COUPLING,** more Add the CP CU1 accessory for the safest, most accurate system for measuring primary power system parameters.

CPC 100 Technical Data

INTERFACE ELEMENTS

1) **6 A or 130 V AC Output**

2) **Current Output 6 A DC**

3) **Current Measuring Input I AC or DC**

4) **Voltage Measuring Input 300 V AC**

5) **Low Level Voltage Measuring Input 3 V AC**

6) **Voltage Measuring Input V DC / 2-wire resistance measurement**

7) **Binary input for potential-free contacts or voltages up to 300 V DC**

See page 7 for details on outputs and inputs.

8) **Safety key lock**
If locked, the quantities which are currently put out are frozen. The unit does not accept any commands except for an Emergency stop.

9) **Signal Lights**
Green light indicates a safe operation, whereas red light indicates an operation with hazardous voltage and/or current levels at the outputs

10) **Emergency stop button**

11) **Keys for quick selection of your application**

12) **Keys for quick selection of your desired view**

13) **LCD monitor**

14) **Soft-touch keys changing according to the selected application**

15) **Keys for selecting stacked test cards**

16) **Numerical keyboard**

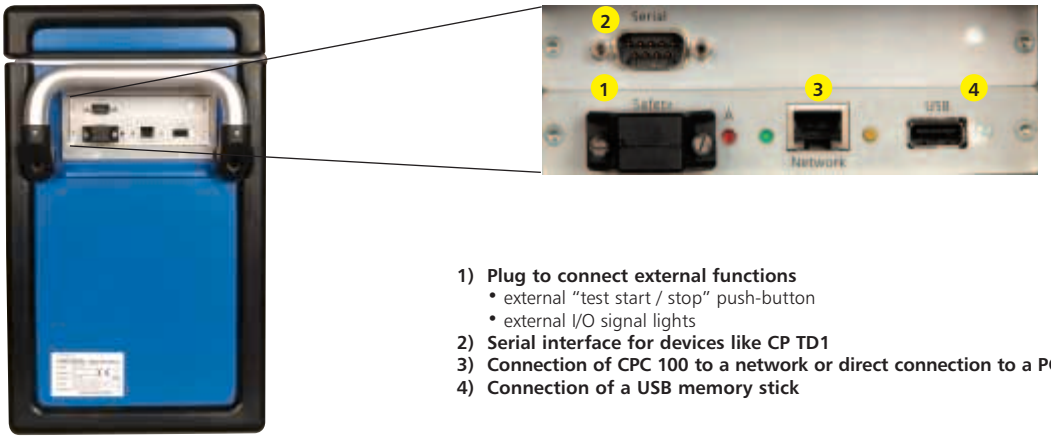
17) **Advanced jog-dial handwheel with "click" (Enter) function**
The handwheel allows for navigation within test cards, within other views, or across views, and it also allows for the entering of values. In 'entering' mode, the wheel's adaptive acceleration function will increase / decrease the input value in ever bigger steps, if the wheel is turned fast. Slow turning will increase / decrease the value in ever smaller steps.

18) **Up / down keys for navigation and entering values**

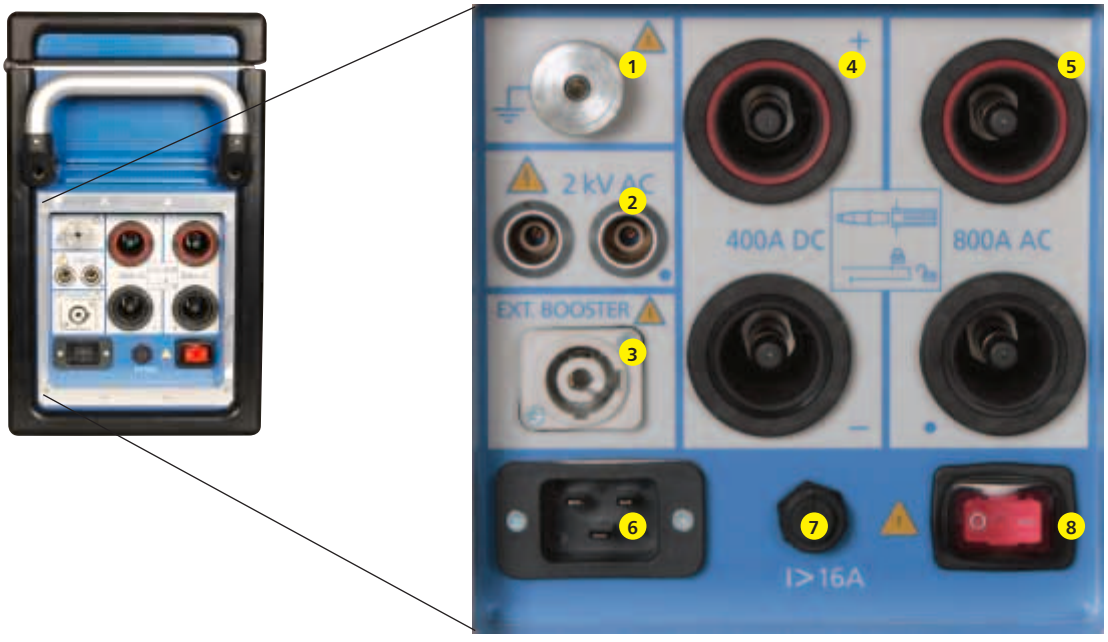
19) **Test start / stop button**

CPC 100 Technical Data

INTERFACE ELEMENTS (CONTINUED)



1) **Plug to connect external functions**
   - external "test start / stop" push-button
   - external I/O signal lights
2) **Serial interface for devices like CP TD1**
3) **Connection of CPC 100 to a network or direct connection to a PC's network connector**
4) **Connection of a USB memory stick**



1) **Grounding terminal**
2) **High AC Voltage Output 2 kV AC** (1 A...5 A AC)
3) **Ext. BOOSTER**
   for the connection of the booster options
4) **High DC current output 400 A DC**
5) **High AC current output 800 A AC**
6) **Mains power supply,** 1 phase, 85 V-264 V AC
7) **Overcurrent protection**
8) **POWER O/I**

CPC 100 Technical Data

TECHNICAL DATA

The output is either voltage or current, and is automatically selected by the software or manually by the user. Current and voltage outputs are overload and short circuit proof and protected against over temperature.

Generator / Output

Current outputs

Range	Amplitude	t_{max}[1]	V_{max}[2]	$Power_{max}$[2]	f
800 A AC[3]	0...800 A	25 s	6.0 V	4800 VA	15-400 Hz
	0...400 A	8 min	6.4 V	2560 VA	15-400 Hz
	0...200 A	> 2 h	6.5 V	1300 VA	15-400 Hz
6 A[10]	0...6 A	> 2 h	55 V	330 VA	15-400 Hz
3 A[10]	0...3 A	> 2 h	110 V	330 VA	15-400 Hz
400 A DC	0...400 A	2 min	6.5 V	2600 W	DC
	0...300 A	3 min	6.5 V	1950 W	DC
	0...200 A	> 2 h	6.5 V	1300 W	DC
6 A DC[4, 10]	0...6 A	> 2 h	60 V	360 W	DC

2000 A AC[3] with an optional Current Booster. Please see page 21 for details.

Voltage outputs

Range	Amplitude[5]	t_{max}	I_{max}	$Power_{max}$[5]	f
2 kV AC[3]	0...2 kV	1 min	1.25 A	2.5 kVA	15-400 Hz
	0...2 kV	> 2 h	0.5 A	1.0 kVA	15-400 Hz
1 kV AC[3]	0...1 kV	1 min	2.5 A	2.5 kVA	15-400 Hz
	0...1 kV	> 2 h	1.0 A	1.0 kVA	15-400 Hz
500 V AC[3]	0...0.5 kV	1 min	5.0 A	2.5 kVA	15-400 Hz
	0...0.5 kV	> 2 h	2.0 A	1.0 kVA	15-400 Hz
130 V AC[10]	0...130 V	> 2 h	3.0 A	390 VA	15-400 Hz

Internal measurement of outputs

Output	Range	Guaranteed accuracy			Typical accuracy[6]		
		Amplitude		Phase	Amplitude		Phase
		Reading	Full Scale	Full Scale	Reading	Full Scale	Full Scale
800 A AC	-	0.20 %	0.20 %	0.20 °	0.10 %	0.10 %	0.10 °
400 A DC	-	0.40 %	0.10 %	-	0.20 %	0.05 %	-
2 kV AC	2000 V	0.10 %	0.10 %	0.20 °	0.05 %	0.05 %	0.10 °
	1000 V	0.10 %	0.10 %	0.30 °	0.05 %	0.05 %	0.15 °
	500 V	0.10 %	0.10 %	0.40 °	0.05 %	0.05 %	0.20 °
	5 A	0.40 %	0.10 %	0.20 °	0.20 %	0.05 %	0.10 °
	50 mA	0.10 %	0.10 %	0.20 °	0.05 %	0.05 %	0.10 °

Guaranteed values valid over one year within 23 °C± 5 °C (73 °F± 10 °F), in the frequency range of 45 ... 65 Hz or DC. Accuracy values indicate that the error is smaller than +/- (Value read * Reading error + Full Scale of the range * Full Scale Error).

1 With mains voltage 230 V with 2 x 6 m high current cable at 23 °C± 5 °C (73 °F± 10 °F) ambient temperature.

2 Signals below 50 Hz or above 60 Hz with reduced values possible.

3 Output can be synchronized with mains.

4 The input / output is protected with surge arrestors between the pins and against protective earth. In case of energies above a few hundred Joule the lightning arrestors apply a permanent short circuit to the input / output.

5 Signals below 50 Hz or above 200 Hz with reduced values possible.

6 98 % of all units have an accuracy better than specified as Typical.

7 Input is galvanically separated from all other inputs.

8 V1 and V2 are galvanically coupled but separated from all other inputs.

9 There are power restrictions for mains voltages below 190 V AC.

10 Fuse protected.

11 Error of reading < than ± value.

Inputs

Measuring inputs

Input	Imped.	Range	Guaranteed accuracy			Typical accuracy[6]		
			Amplitude		Phase	Amplitude		Phase
			Reading	Full Scale	Full Scale	Reading	Full Scale	Full Scale
I AC/DC[4,7]	< 0.1 Ω	10 A AC	0.10 %	0.10 %	0.20 °	0.05 %	0.05 %	0.10 °
		1 A AC	0.10 %	0.10 %	0.30 °	0.05 %	0.05 %	0.15 °
		10 A DC	0.05 %	0.15 %	-	0.03 %	0.08 %	-
		1 A DC	0.05 %	0.15 %	-	0.03 %	0.08 %	-
V1 AC[8]	500 kΩ	300 V	0.10 %	0.10 %	0.20 °	0.05 %	0.05 %	0.10 °
		30 V	0.10 %	0.10 %	0.20 °	0.05 %	0.05 %	0.10 °
		3 V	0.20 %	0.10 %	0.20 °	0.10 %	0.05 %	0.10 °
		300 mV	0.30 %	0.10 %	0.20 °	0.15 %	0.05 %	0.10 °
V2 AC[8]	10 MΩ	3 V	0.05 %	0.15 %	0.20 °	0.03 %	0.08 %	0.10 °
		300 mV	0.15 %	0.15 %	0.20 °	0.08 %	0.08 %	0.10 °
		30 mV	0.20 %	0.50 %	0.30 °	0.10 %	0.25 %	0.15 °
V DC[4, 7]	500 kΩ	10 V	0.05 %	0.15 %	-	0.03 %	0.08 %	-
		1 V	0.05 %	0.15 %	-	0.03 %	0.08 %	-
		100 mV	0.10 %	0.20 %	-	0.05 %	0.10 %	-
		10 mV	0.10 %	0.30 %	-	0.05 %	0.15 %	-

- Automatic range switching
- Galvanically separated potential groups: **I AC/DC** ; **V1 & V2** ; **V DC**
- AC frequency range 15 - 400 Hz
- Protection of **I AC/DC** input: 10 A FF fuse[4]

Binary input for dry contacts or voltages up to 300 V DC[7]- see (7) on page 5

Trigger criteria	Toggling with potential free contacts or voltages of up to 300 V.
Input impedance	> 100 kΩ
Response time	1 ms

Ω meter (DC)

Mode	Connection	Range	Current	Accuracy (full scale)	
				Guaranteed	Typical
0.5 μΩ ... 12.5 mΩ	4-wire	400 A DC	400 A	0.85 %	0.45 %
10 μΩ ... 1 Ω	4-wire	6 A DC	6 A	0.60 %	0.35 %
100 μΩ ... 10 Ω	4-wire	6 A DC	1 A	0.40 %	0.25 %
0.2 Ω ... 20 kΩ	2-wire	V DC in	<5 mA	1.00 % + 0.2 Ω[11]	0.50 % + 0.1 Ω[11]

General

Display	1/4 VGA greyscale LCD display
USB Memory	USB 2.0 Guaranteed communication of USB sticks supplied by OMICRON

Power Supply

Single-phase, nominal[9]	100 V AC ... 240 V AC, 16 A
Single-phase, permissible	85 V AC ... 264 V AC (L-N or L-L)
Frequency, nominal	50/60 Hz
Power consumption	<3500 VA (<7000 VA for short time < 10 sec)
Connection	IEC320/C20

Environmental conditions

Operating temperature	-10 ... +55 °C (+14 ... +131 °F)
Storage temperature	-20 ... +70 °C (-4 ... +158 °F)
Humidity range	Rel. humidity 5 ... 95 %, non-condensing
Shock	IEC68-2-27 (operating) 15 g / 11 ms half sine
Vibration	IEC68-2-6 (operating) 10 ... 150 Hz : 2g
EMC	EN 50081-2, EN 55011, EN 61000-3-2, FCC Subpart B of Part 15 Class A, EN 50082-2, IEC 61000-4-2/3/4/8 CE conform (89/336/EEC)
Safety	EN 61010-1, EN 60950, EN 50191, IEC 61010-1 Produced and tested in an EN ISO 9001 certified company
Weight	29 kg (64 lbs), robust case with cover
Dimensions	468 x 394 x 233 mm (18.6 x 15.5 x 9.2 ") (W x H x D with cover, without handles)

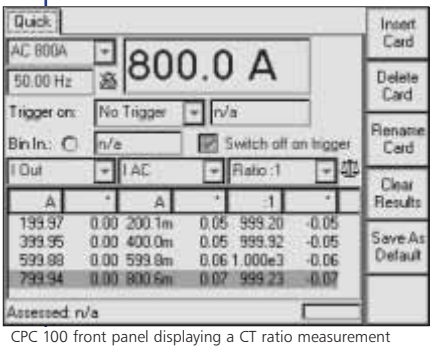
CPC 100 Applications

APPLICATIONS

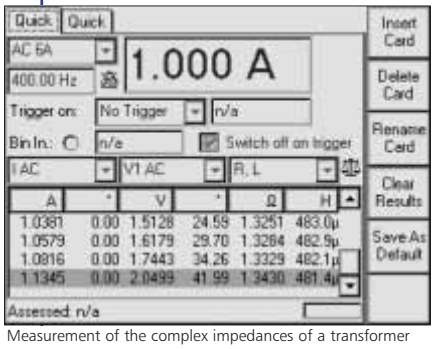
The software described in the Software section runs in the embedded processor within the CPC 100 and can be operated with front panel control.

No additional PC is required.

Quick Manual Control



CPC 100 front panel displaying a CT ratio measurement



Measurement of the complex impedances of a transformer

Quick

Testing almost any function using direct manual control of the current and voltage outputs and measurements

This function allows any manipulation of the selected output range of the CPC 100. All output terminals available on the CPC 100 can be selected and controlled.

Measuring two quantities in two columns such as AC or DC voltages in amplitude and phase angle, AC or DC currents in amplitude and angle, or the frequency of any selected output, is easily done by selecting the desired quantities.

Quick also automatically performs calculations derived from the quantities described above, such as S, P, Q, Z, R, R-X, R_S-L_S, R_P-C_P, ratio:1, ratio:5, ΔV and ΔI, and displays them in the third column.

Any relevant measured value can easily be stored by pressing Keep Result. Thus, all important results are arranged and displayed in a table, and can be further investigated at any time. The entire testing session can be saved as a file.

A trigger functionality allows for triggering to a certain event, such as reaching a threshold value or the switching of a contact. The trigger can be binary or analog, or it can be an overload of the unit. For each trigger event, both the current output value and the delay time are measured, which allows the testing of pick up and drop off values of primary relays.

Complex impedances of transformers, inductors or capacitors can be measured. The amplifier technology used enables a wide range of testing frequencies different from the mains frequency. The built-in digital filters allow for sensitive and selective measuring without interference problems. With this concept, a lot of tests can be performed with small test signals (instead of using big and heavy conventional test equipment with high test signals at mains frequency).

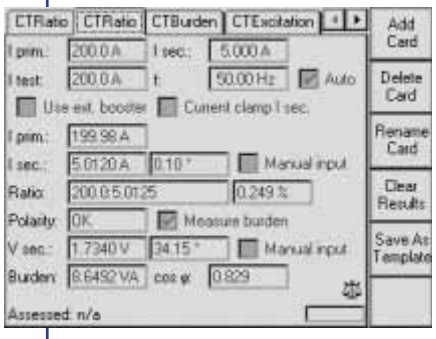
Reporting is done automatically.

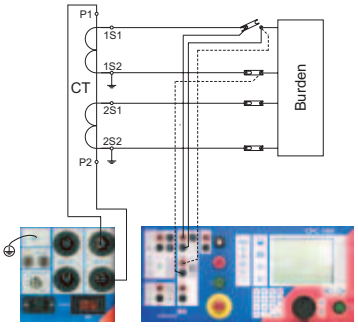
CPC 100 Applications

CURRENT TRANSFORMER (CT)

CT Ratio, Burden, and Excitation

Note: for input current measuring, the direct current input or the current probe can be used.





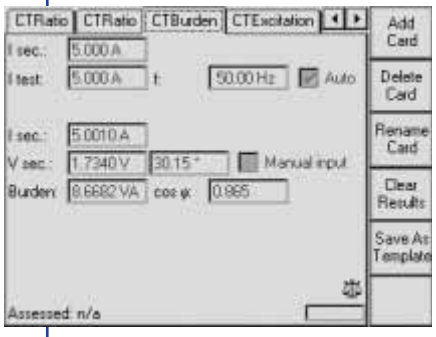
CT Ratio Burden

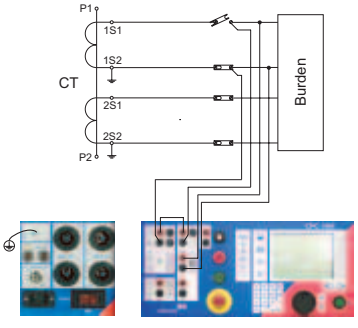
Tests ratio, polarity (and burden) with direct injection to CT primary current input and measuring of secondary output

After entering I primary, I secondary and test current, and pressing the Start button, the test card measures:

- Secondary current with magnitude and angle (CT angle error)
- Ratio with error in percent
- Polarity on the CT terminals
- Connected burden in VA and power factor (cos φ)

Duration of the test: ~ 3s including automatic reporting
Output: up to 800 A (2000 A) AC
Input: up to 10 A AC / 3 V or 300 V via current clamp.





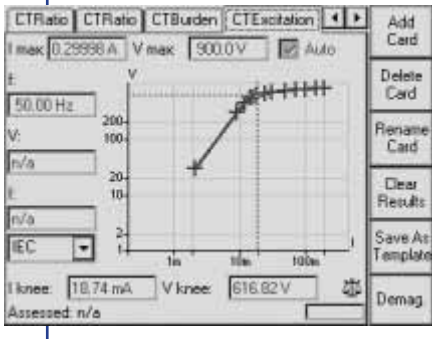
CT Burden

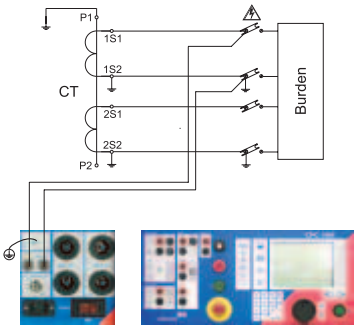
Measures connected CT burden load with direct injection of secondary current with disconnected CT

After entering the secondary nominal current and the test current, and pressing the Start button, the test card measures:

- Secondary voltage in magnitude and angle
- Connected burden in VA and power factor (cos φ)

Duration of the test: ~ 3s including automatic reporting
Output: up to 6 A AC
Input: up to 10 A AC / 3 V via current clamp and 300 V





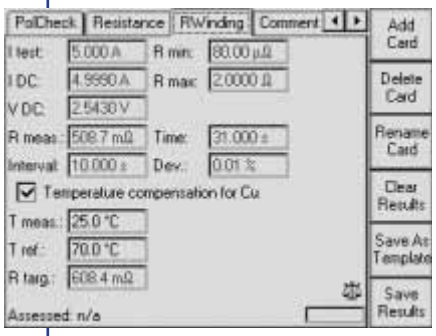
CT Excitation

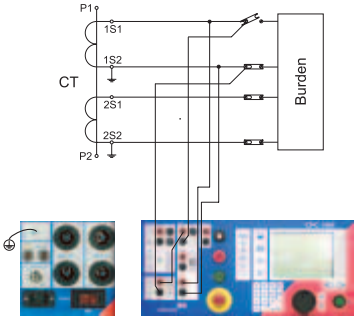
Tests the excitation curve

The necessary wiring is only two leads from the voltage output to the open secondary wiring of the CT. After entering the current and voltage limits and pressing the Start button, the test card will automatically record the CT excitation curve according to IEC 60044-1, ANSI 45°, or ANSI 30° standards, and the kneepoint will be automatically calculated. After the test the core is demagnetized. The test is done using a regulated voltage source.

Duration of the test: ~ 30 s including automatic reporting with recorded excitation curve, and calculated kneepoint voltage.
Output: up to 2000 V AC

Winding Resistance, Voltage Withstand Test, and CT Ratio V





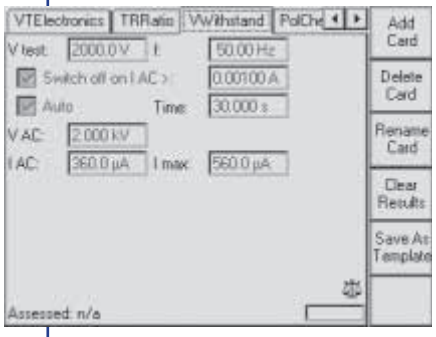
Winding Resistance

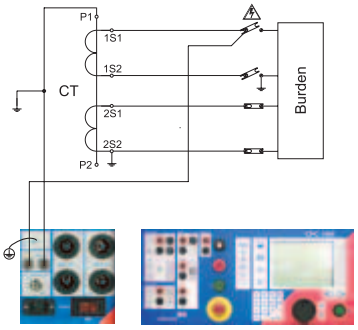
Measures CT winding resistance

After entering the test current and pressing the Start button, the test card

- displays the deviation of the measurement over time during the period of charging the winding
- automatically performs a discharging of the winding after saving the measurement
- measures the DC voltage
- measures the resistance
- (optionally) compensates the temperature behavior of copper, where the applied temperature compensation calculates the resistance for working temperature

Duration of the test: depending on the charging time. After the charging period, the user creates the report by pressing Save Results.
Output: up to 6 A DC or 100 A DC (6.5 V)
Input: up to 10 V DC





Voltage Withstand

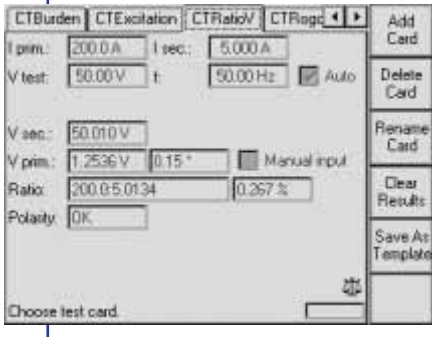
Tests the voltage withstand capability of the insulation between primary and secondary winding or ground and secondary winding

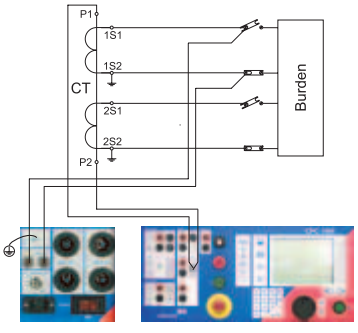
After entering the test voltage and the duration, and pressing the Start button, the test card

- determines the leakage current flowing through the insulation.

The current threshold for maximum leakage current can be entered. The CPC 100 will automatically switch off if the maximum leakage current is exceeded.

Duration of the test: can be set by the user; the test report will be created after the test automatically.
Output: up to 2 kV AC





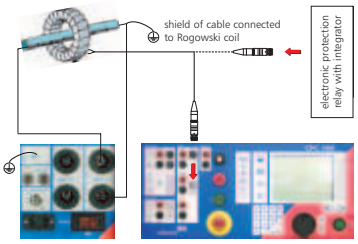
CT Ratio V

Tests ratio and polarity with direct injection of the voltage to the CT secondary input (common method for bushing CTs)

After entering primary and secondary current and the test voltage, and pressing the Start button, the test card

- measures the actual ratio
- calculates the deviation of amplitude and phase angle of the voltage of the CT primary side.

Duration of the test: ~ 3s including automatic reporting
Output up to 130 V.
Input: up to 3 V and 300 V AC



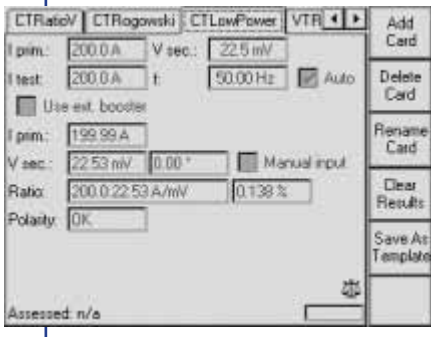
CT Ratio Rogowski

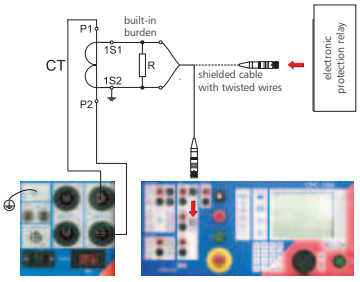
Measures the ratio for CTs with Rogowski coil principle (induced voltage is proportional to the conductor current differentiated with respect to time)

After entering primary current, secondary voltage, test current, nominal frequency and pressing the Start button, the test card

- measures the amplitude of the injected current
- measures the Rogowski coil's output voltage and phase angle
- calculates the actual ratio
- calculates the deviation from the nominal ratio

Duration of the test: ~ 5 s including automatic reporting
Output: up to 800 A (2000 A with Current Booster CP CB2)
Input: up to 3 V AC





CT Ratio Low Power

Measures the ratio for CTs with low power principle (output voltage is proportional to primary current)

After entering primary current, secondary voltage, and the test current, and pressing the Start button, the test card

- measures the amplitude of the injected current
- measures the low power output voltage and phase angle
- calculates the actual ratio
- calculates the deviation from the nominal ratio

Duration of the test: ~ 5 s including automatic reporting
Output: up to 800 A (2000 A with Current Booster CP CB2)
Input: up to 3 V AC

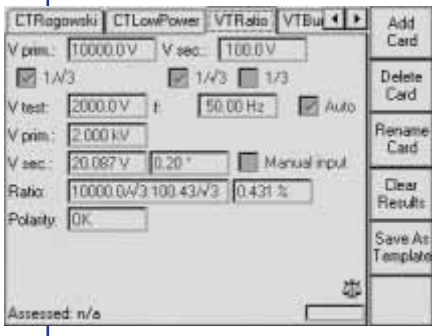
Polarity Checker

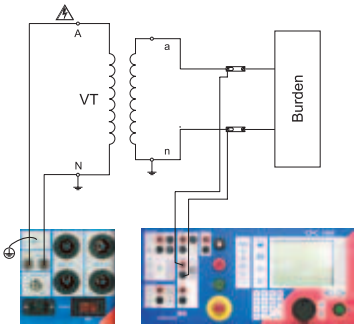
The Polarity Checker option can be found in the Accessories section, page 21.

CPC 100 Applications

VOLTAGE TRANSFORMER (VT)

VT Ratio, Polarity, and Burden, Electronic VT





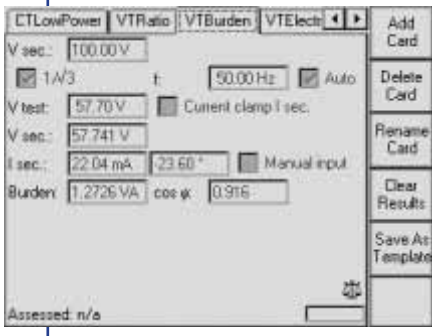
VT Ratio and Polarity

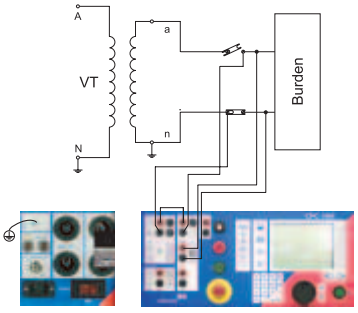
Measures the capacitive or inductive VT ratio and polarity

After entering the primary voltage, secondary voltage and test voltage, and pressing the Start button, the test card

- measures amplitude and phase of the voltage on the transformer's secondary side
- calculates the actual ratio, the deviation and the polarity

Duration of the test: ~ 5 s including automatic reporting
Output up to 2 kV
Input: up to 300 V AC





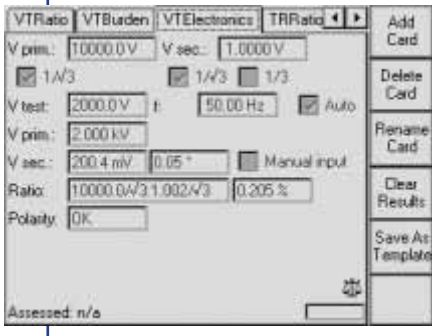
VT Burden

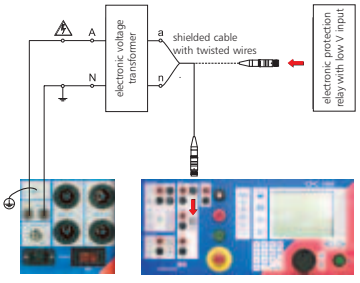
Measures the connected secondary burden of the VT

After entering the nominal secondary voltage and the test voltage, and pressing the Start button, the test card measures

- the connected secondary burden with voltage injection on the VT's secondary side
- the connected secondary burden in VA and the power factor (cos φ) including the secondary current and the angle between voltage and current

Duration of the test: ~ 5s including automatic reporting
Output up to 130 V AC
Input: up to 10 A AC and 300 V AC





Electronic Voltage Transformer

Measures ratio and polarity of non-conventional electronic VTs

After entering the primary voltage, the secondary voltage and the test voltage, and pressing the Start button, the test card

- measures the low level secondary voltage
- calculates the actual ratio, the deviation, and the polarity.

Duration of the test: ~ 5s including automatic reporting
Output: up to 2 kV
Input: up to 3 V or 300 V AC

Voltage Withstand Test

The voltage withstand test is described in the CT section, page 10.

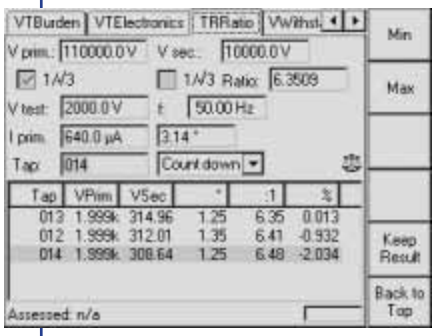
Polarity Checker

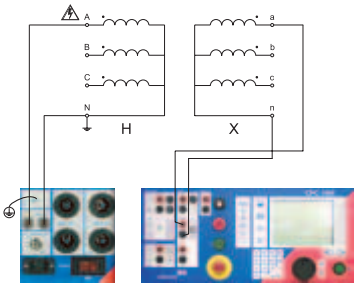
The Polarity Checker option can be found in the Accessories section, page 21.

CPC 100 Applications

POWER TRANSFORMER

Power Transformer Ratio, Tap Changer Test



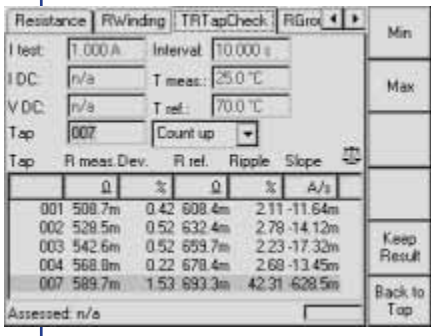


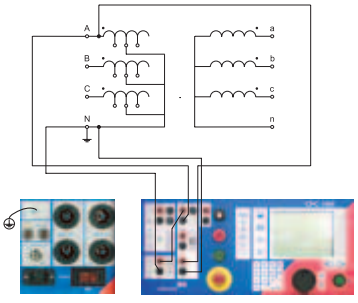
Transformer Ratio (per Tap)

Measures ratio and excitation current per tap

For this test, a test voltage of up to 2 kV is injected on the transformer high voltage side. This voltage is measured internally with high precision. The voltage (amplitude and phase angle) on the low level voltage winding is measured back via the measuring input. The ratio is calculated automatically. The excitation current in amplitude and phase angle is also measured and reported.

Duration of the test: ~ 5 s per tap including automatic reporting
Output: up to 2 kV
Input: up to 300 V





Resistance and Continuity of OLTC (per Tap)

Measures winding resistance per tap and detects interruptions of on-load tap changer (OLTC) diverter switches

The voltage drop at the winding resistance is measured with a sense line. The resistance value of each tap can easily be saved to a table containing all taps. An automatic temperature compensation is possible. Interruptions of the current because of a faulty diverter can be detected.

Duration of the test: depends on the inductivity of the winding inductance. Due to the high output voltage of up to 65 V, testing time is reduced
Output: up to 6 A DC (65 V) or up to 100 A DC (6.5 V)
Input: up to 10 V DC and 10 A DC

Voltage Withstand Test

The voltage withstand test is described in the CT section, page 10.

Winding Resistance

The winding resistance test is described in the CT section, page 10.

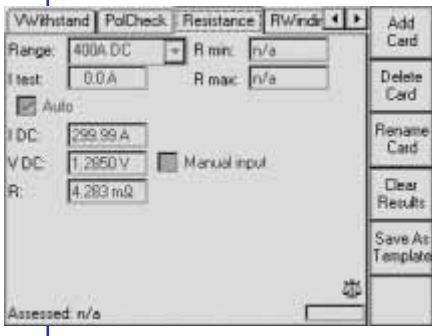
Power Factor

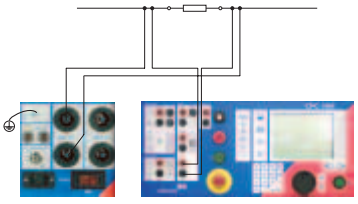
See CPC 100 Accessories - CP TD1 tangent delta / power factor measuring, page 18.

CPC 100 Applications

RESISTANCE

Resistance μΩ measurement, Ground Resistance





Resistance μΩ Measurement

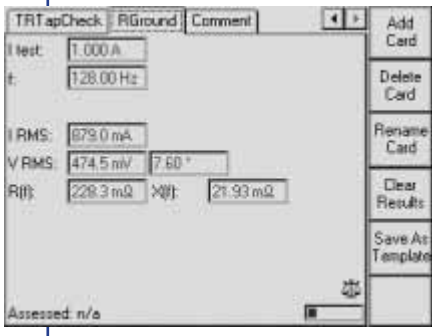
Measures test objects with very low resistance such as contacts of circuit breakers and buswire connectors

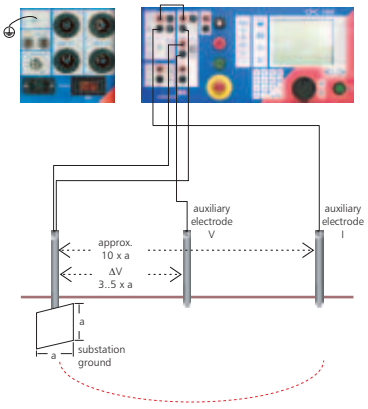
After connecting the test object (4-wires), entering the test current, and pressing the Start button, the test card measures

- the resistance of the test object.

The test current can be selected from 0 ... 400 A.

Duration of the test: ~ 5 s including automatic reporting
Output: up to 400 A DC
Input: up to 10 V DC





Ground Resistance

Measures ground resistance or soil resistivity

The ground resistance of substations can be measured with two auxiliary electrodes which are put into the ground. To avoid influences from the mains current and its harmonics, this measurement should preferably be carried out with 128 Hz.The high output power of the CPC 100 ensures a high ratio of the signal level to the noise level. Thanks to the signal processor technology, the measuring procedure is very selective and disturbances by ground currents are reduced to a minimum. For large grounding systems, the auxiliary electrode for the current injection is replaced by a second grounding system which is connected to the current output of the CPC 100 via an auxiliary line. For this application the use of CP CU1 (see page 19) is recommended to obtain higher output power. For measuring the soil resistivity four auxiliary electrodes are used.

Duration of the test: ~ 5 s including automatic reporting
Output: up to 6 A AC
Input: up to 3 V or 300 V AC and 10 A AC

Winding Resistance

The winding resistance test is described in the CT section, page 10.

AUTOMATIC TEST PROCEDURES

Sequencer and Ramping

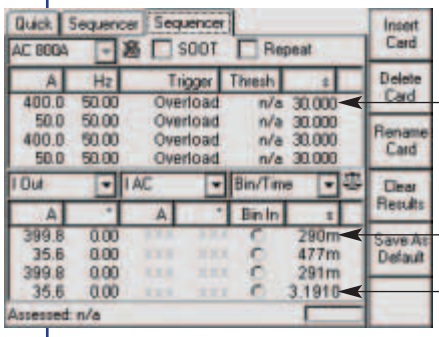
With general application cards, some simple testing of single phase relays is possible, such as the determination of trip times of I>, V>, V<, or frequency relays. With Sequencer and Ramping the user can create her/his own automatic test procedures.

Sequencer

Typical Applications

- Testing of auto-reclosure cycles with primary current injection up to 2000 A; opening/closing of the circuit breaker contact is detected internally by the OMICRON hardware, so no extra wiring is required;
- Measurement of the opening/closing time of circuit breakers;
- Testing of primary overcurrent relays;
- Testing of low voltage circuit breakers with protection functions; etc.
- Automatic testing with different amplitudes (e.g. CT ratio at 0.05 In, 0.2 In, 0.5 In, 1 In and 1.2 In)

The user can define consecutive states and the transition between states, which can be initiated by a timeout, a trigger, or a combination of the two. Seven successive automatic measurements on predefined levels are possible. Further, the signals can be generated with a repeat function, so that the sequence can be run in an "endless loop"; up to 100 results can be recorded.



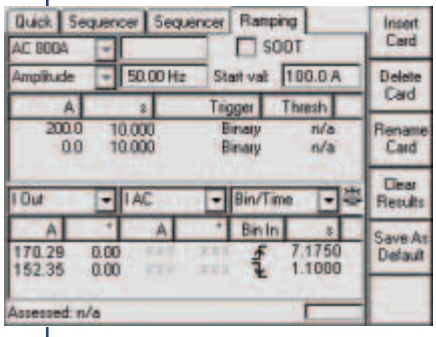
Example: Overcurrent relay with auto-reclosure function

State 1: wait for the circuit breaker (CB) to open
Output 400 A until the trigger condition "Overload" occurs.
The measurement table displays: relay time + the CB opening time = 290 ms

State 2: wait for the CB to close (short dead time)
Output 50 A until the "Overload" condition that startet state 2 clears.
The measurement table displays: short dead time + CB closing time = 477 ms

State 3: wait for the CB to open
Like state 1

State 4: wait for the CB to close (long dead time)
The measurement table displays: long dead time + CB closing time = 3.1910 s



Ramping

The functionality of the Ramping test card includes the automatic measurement of the pick up and drop off values of overcurrent relays. Also, CB contact resistances can be measured with ramp functions to avoid induced voltages in CT windings. Up to five ramps can be defined, with detailed results being available for each.

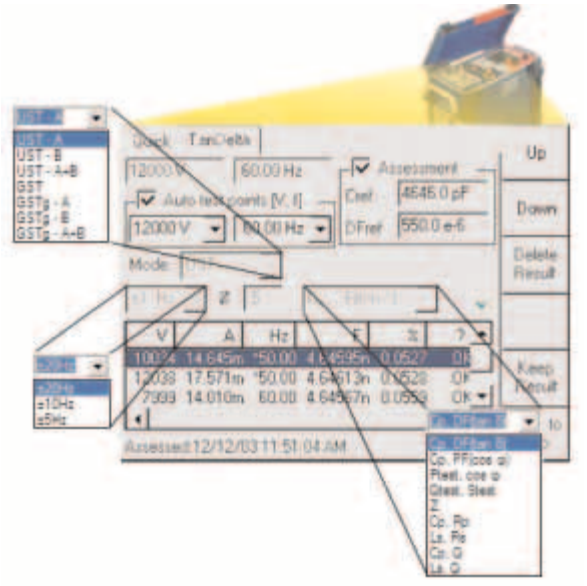
CPC 100 Applications

POWER FACTOR IMPEDANCE MEASURING

TD1

Insulation Diagnosis (Tangent Delta / Power Factor Test)

The condition of the insulation is an essential aspect for the operational reliability of electrical power transformers, generators, and other high voltage equipment.



CPC 100 + CP TD1 provide laboratory precision for capacitance and dissipation / power factor measurements in the field.

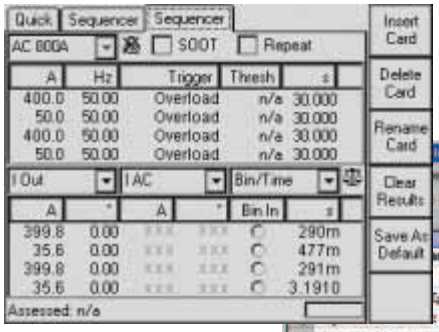
Quantities measured include:

- Capacitance Cp
- Dissipation factor tan δ (tangent delta)
- Power factor cos φ
- Power (active, reactive, apparent)
- Impedance (absolute value, phase, inductivity, resistance, Q)

CU1

Primary Measurements (Line & Ground Impedances, k-factors, mutual coupling)

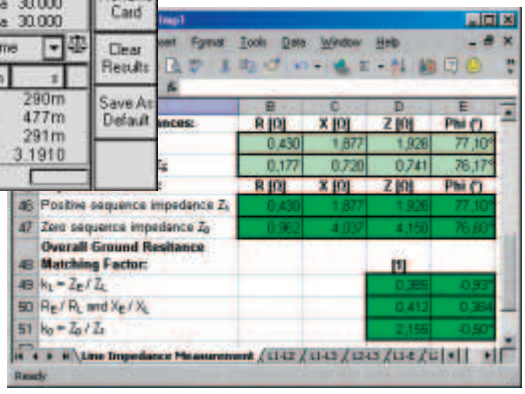
Accurate data of the primary lines, feeders, and grounding are critical for operational reliability of electrical power systems where modeling programs are used for design or when protective settings are applied.



CPC 100 + CP CU1 coupling unit provides the ability to safely and accurately measure parameters of overhead lines, power cables, and grounding grids. This system can determine:

- Line Impedances & k-factors of overhead lines or power cables,
- Mutual coupling of parallel lines,
- Coupling of power lines to signal cables,
- Ground Impedances of large substations,
- Step & touch voltages

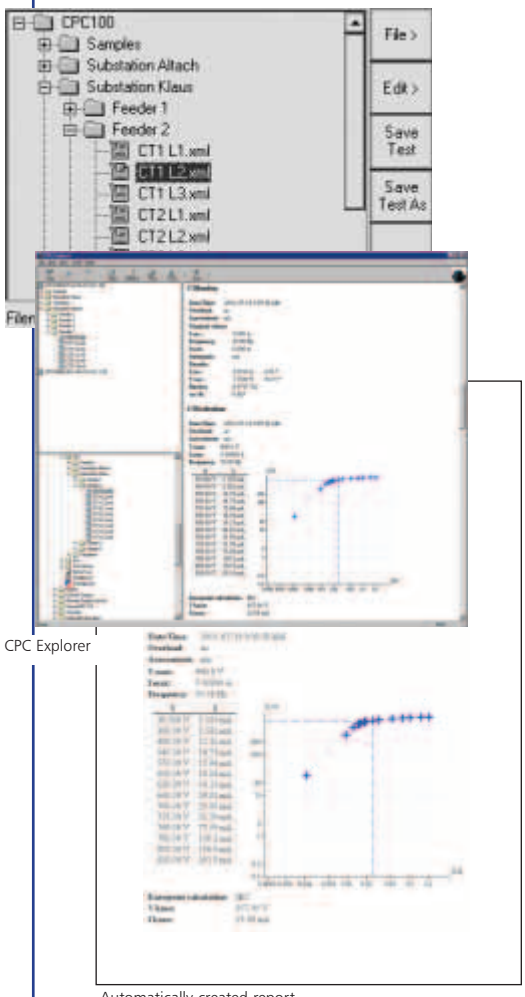
Transferred measurement results >



CPC 100 Report/Test Preparation

REPORTS PREPARING TESTS OFFLINE

Reports



CPC Explorer

Automatically created report

CPC Explorer

The CPC Explorer is a PC software shipped with the CPC 100.
The unit provides internet connectivity through an Ethernet connection, both in a network and from a directly connected PC.

From within CPC Explorer, the following is possible:

- Reporting
- Downloading data for archiving and further processing on the PC
- Uploading data for re-using pre-prepared templates
- Easy software upgrading
- Service and maintenance (remote trouble shooting)

Automatic saving of all results or test parameters

All test results are automatically saved and stored with the test. This data can be organized according to the user's needs. A Microsoft ™ Windows Explorer-like display provides access to stored data and allows for easy management and organization of test data (File view).
Also, once tests have been defined satisfactorily, they can be saved to serve as templates for new tests. This allows easy reproduction of any test at any time, no matter how complex. Once the brainwork has been done, execution at different locations or different points in time become a matter of pressing a button.

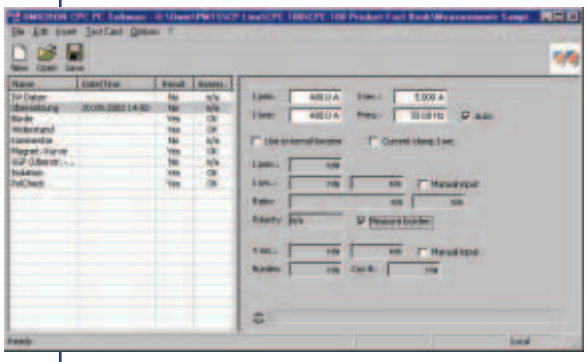
Automatic reporting of all performed tests

As all test results are automatically saved and stored with any test, the results can be reported from a connected PC, at any time via the CPC Explorer (PC software). Since the test data is stored in XML format (a standard format for exchanging data), and the report is provided in HTML format, all Internet capabilities can be utilized, including embedded graphics.

Conversely, uploading data for archiving and further processing on the PC is supported. Exporting to standard desktop applications such as text processors (e.g. Microsoft™ Word), databases, or spreadsheet programs is also possible, as XML format is used.

Reporting archived results is possible in exactly the same way as directly from the CPC 100.

Adaptations of the report are possible by creating any custom data format using the XML data.



CPC Editor
Reduce on-site testing time to a minimum by preparing tests offline on a standard PC

CPC Editor allows for setting up single test cards, or entire tests with several test cards, with all test-specific settings. This is done on a standard PC, independent from the CPC 100.

These test files (.XML) can be loaded to/from a CPC 100 using CPC Explorer.
Once run, they also contain the test results and assessments and can be viewed with CPC Editor.
Saved tests can be used as templates or procedures, just clear results and save with a new filename.

CPC 100 Accessories

CP TD1 TANGENT DELTA & POWER FACTOR

The CP TD1 capacitance and tangent delta / power factor measuring instrument is an accessory unit to the CPC 100, completing its use for power transformer testing with the ultimate insulation diagnosis solution. Controlled by the CPC 100, the CPC 100 + CP TD1 combination provides fully automated testing and reporting capabilities for the comprehensive testing of transformer parameters within one portable system.

The application of innovative measurement techniques and the use of high precision components in the CP TD1 bring laboratory precision with a rugged design into the field of insulation condition testing. The CP TD1 also offers new test methods such as testing with frequency sweeps. A custom-built trolley allows for practical handling on and off-site along with easy and quick breakdown into portable components.

Quantities measured include:
- Capacitance Cp
- Dissipation factor tan δ (tangent delta)
- Power factor cos φ
- Power (active, reactive, apparent)
- Impedance (absolute value, phase, inductivity, resistance, Q)

CP TD1 with transport trolley

Technical Data CP TD1 (with CPC 100)

The CP TD1 is connected via interfaces to the CPC 100 and thus does not need further control elements.

High voltage output			
V	I	t_{max}	at f (Hz)[1]
0…12 kV AC	300 mA	>2 min	15 … 400
	100 mA	>60 min	

Voltage / current measurement		
Range	Resolution	Accuracy
12000 V AC	1 V	error < 0.3 % reading + 1V
5 A AC	5 digits	error < 0.5 % reading
8 mA AC		error < 0.3 % reading + 100 nA

Capacitance Cp (equivalent parallel circuit)			
Range	Resolution	Accuracy	Conditions
1 pF … 3 μF	6 digits	error < 0.05 % reading + 0.1 pF	< 8 mA
		error < 0.2 % reading	> 8 mA

[1] Signals below 45 Hz with reduced values possible. Capacitive linear loads.

Dissipation factor DF (tan δ)			
Range	Resolution	Accuracy	Conditions
0 … 10 % (capacitive)	5 digits	error < 0.1 % reading + 0.005 %	15 ... 70 Hz
			< 8 mA
0 … 100 (0..10000 %)	5 digits	error < 0.5% reading + 0.02 %	-

Power factor cos φ			
Range	Resolution	Accuracy	Conditions
0 … 10 % (capacitive)	5 digits	error < 0.1 % reading + 0.005 %	15 ... 70 Hz
			< 8 mA
0 … 100 %	5 digits	error < 0.5 % reading + 0.02 %	-

Representation of the following values is also possible:
- Power (active, reactive, apparent)
- Impedance (absolute value, phase, inductivity, resistance, Q)

Nominal voltage CPC 100	1 x 100 ... 240 VAC / 50 ... 60 Hz / 16 A
Operating temperature	-10 … +55 °C (+14 ... +131 F)
Transport and storage	-20 … +70 °C (-4 ... +158 F)
Relative humidity	5 ... 95 %, non condensing

CPC 100 Accessories

CP CU1 LINE & GROUND IMPEDANCE

The multifunctional primary test system CPC 100, in combination with the coupling unit CP CU1, is the world-wide unique measurement system for:

- Line impedances and k-factors of overhead lines or power cables,
- Mutual coupling of parallel lines,
- Coupling of power lines into signal cables,
- Ground impedances of large substations,
- Step and touch voltages.

The test system overcomes the problem of power system frequency interference that has previously made it necessary to use extremely large, high-power equipment to carry out these measurements. The use of switched mode amplifiers and frequency-shift techniques facilitates accurate measurements with compact portable equipment.

As measurements on high voltage lines need special safety measures, the CP CU1 coupling unit is used to couple the inputs and outputs of the CPC 100 to the transmission line safely. The grounding box CP GB1 is used to make the connection from the CP CU1 to the overhead line and can be located at a safe distance from the operator. The grounding box allows the discharge of currents up to 30 kA once its voltage limit is exceeded.

Multifunctional primary test system CPC 100 in combination with the coupling unit CP CU1 and the grounding box CP GB1

Technical Data CP CU1 (with CPC 100)

For detailed information on the CP CU1 please see our product information brochure "CP CU1 - Extension to the CPC 100".

Current Output Ranges	
Current range	Compliance voltage
0 ... 10 A rms	500 V rms
0 ... 20 A rms	250 V rms
0 ... 50 A rms	100 V rms
0 ... 100 A rms	50 V rms

Measuring Transformers		
VT	600 V : 30 V	class 0.1
CT	100 A : 2.5 A	class 0.1

Mechanical Data

Protection	IP 20
Dimensions (w × h × d)	450 x 220 x 220 mm / 17.7 x 8.7 x 8.7 inch
Weight	28.5 kg / 63 lb

Environmental Conditions

Operating temperature	-10 ... +55 °C / 14 ... 131 °F
Transport & storage Temperature	-20 ... +70 °C / -4 ... 158 °F
Relative humidity	5 ... 95 %, non condensing
Safety	EN 61010-1
Prepared for	IEEE 510, EN 50191 (VDE 104), EN 50110-1 (VDE 105 Part 100), LAPG 1710.6 NASA

[1] At an ambient temperature of 23 °C ± 5 °C / 73 °F ± 10 °F

Technical Data CP GB1

Electrical Data

Nominal ac spark-over voltage	<1000 V rms
Short circuit proof	up to 30 kA for 100 ms

Mechanical Data

Dimensions (Ø × h)	200 x 190 mm / 7.9 x 7.5 inch
Weight	6.8 kg / 13.2 lb (including grounding cable)

Accessories

Special accessories for step, touch and ground impedance on request

Overall System (with CPC 100)

Output Power[1]

5000 VA, cos φ < 1.0 for 8 s @ 230 V ac mains voltage
5000 VA, cos φ < 0.4 for 8 s @ 115 V ac mains voltage

Accuracy[1]		
Measured value	Typical accuracy	Current range
0.05 ... 0.2 Ω	1.0 ... 0.5 %	100 A
0.2 ... 2 Ω	0.5 ... 0.3 %	100 A
2 ... 5 Ω	0.3 %	50 A
5 ... 25 Ω	0.3 %	20 A
25 ... 300 Ω	0.3 % ... 1.0 %	10 A

CPC 100 Accessories

12 KV OIL TEST CELL, COMPENSATING REACTOR

12 kV Oil Test Cell CP TC12

The CP TC12 is used in conjunction with the CPC100 and the CP TD1 to measure the Permittivity and Tangent Delta / Power Factor of insulation liquids, e.g. transformer oil. The three-electrode design with guard allows precise measurement, especially of small losses.

The circular electrodes are constructed from rigid stainless steel and require a sample of 1.2 to 2 liters (41 to 68 fl.oz.). Electrical connection to the Test Cell is made using the standard cables provided with the CP TD1.

Technical Data

Cell Type:	Three-terminal, guarded
Cell Gap Spacing:	11 mm (2.31"), nominal
Sample Volume:	1.2 liters (min) to 2 liters (max) (41 to 68 fl.oz.)
Cell Capacitance:	65 pF, nominal (in air)
Maximum Test Voltage:	12 kV rms
Voltage Operating Range:	2.5 to 12 kV for a stress of 200 to 1100 V/mm (7.87 to 43.31 V/inch)
Connectors:	6 mm (0.24") sockets for high voltage cable 4 mm (0.15") sockets for measuring cables
Dimensions:	22 x 25 cm (8.7" x 10.2") [diameter x height]
Weight:	approx. 6 kg (13.2 lbs.)
Article Nr.:	VEHZ0601

Compensationg Reactor CP CR500

The CP CR500 allows Power Factor / Tangent Delta measurements of large motors and generators. In combination with the multifunctional Primary Test Set CPC 100 and the Tangent Delta / Power Factor unit CP TD1 one CP CR500 compensates capacities of up to 500 nF.

To compensate even larger capacities, two devices can be connected in parallel. This allows compensation of up to 1000 nF.

Benefits:
- Portable high power solution due to size and weight
- Flexible by using different numbers of units and/or by changing the test frequency (35 ... 85 Hz)

Technical Data (with one CP CR500)

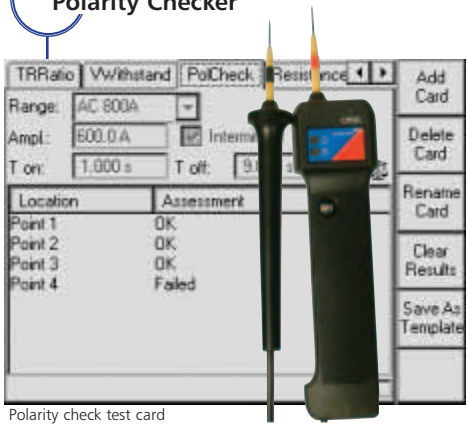
Maximum Test Voltage:	12 kV rms (≥ 50 Hz)
Inductors:	2 x 40 H
Current Compensation:	2 x 1 A
Capacity Compensation:	2 x 250 nF (50 Hz) 2 x 500 nF (35 Hz)
Dimensions:	468 x 394 x 233 mm / 18.6 x 15.5 x 9.2"
Weight:	33 kg / 73 lbs
Article Nr.:	VEHZ0602 (single unit) VEHZ0603 (set of two units)

For detailed information on these products please see our product information sheet "12 kV Oil Test Cell - CP TC 12" and "Compensationg Reactor CP CR 500".

CPC 100 Accessories

POLARITY CHECKER, CURRENT BOOSTER

Polarity Checker



Polarity check test card

CPOL polarity checker

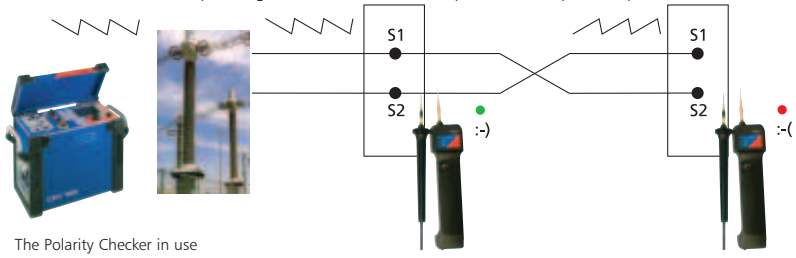
Current Booster CP CB2

The Current Booster CP CB2 connected to CPC 100

Polarity Checker (Replacement for Battery Checking Method)

Checks a series of test points for correct wiring

Just inject a the special continuous test signal at one point with the CPC 100 and check the polarity at all terminals with CPOL as shown in fig. 1, getting a clear indication whether the polarity is OK (green LED) or not (red LED).
This procedure is much faster than the conventional method and can easily be performed by a single person.
Duration of the test: depending on the number of test points; 3-5 s per test point



The Polarity Checker in use

Current Booster CP CB2

Tests applications requiring up to 2000 A

The output current of the CPC 100 can be increased to up to 2000 A by an electronically controlled current booster. The CP CB2 can be connected close to the busbar using short high current leads and to the CPC 100 with a long control cable.

Current outputs					
Range	**Amplitude**	**t_{max}**[1]	**V_{max}**[2]	**$Power_{max}$**[2]	**f**
1000 A AC[3]	0...1000 A	25 s	4.90 V	4900 VA	15-400 Hz
	0...500 A	30 min	5.00 V	2500 VA	15-400 Hz
2000 A[4]	0...2000 A	25 s	2.45 V	4900 VA	15-400 Hz

Internal measurement of outputs						
Output	**Guaranteed accuracy**			**Typical accuracy**		
	Amplitude		**Phase**	**Amplitude**		**Phase**
	Reading	**Full Scale**	**Full Scale**	**Reading**	**Full Scale**	**Full Scale**
2000 A AC	0.25 %	0.25 %	0.50 °	0.13 %	0.13 %	0.25 °
1000 A AC	0.25 %	0.25 %	0.50 °	0.13 %	0.13 %	0.25 °

Dimensions: 186 x 166 x 220 mm (7.3 x 6.5 x 8.7 "), without handle
Weight: 16.0 kg, 35.3 lbs

[1] With mains voltage 230 V at 23 °C ± 5 °C (73 F± 10 F) ambient temperature.
[2] Signals below 50 Hz or above 60 Hz with reduced values possible.
[3] Outputs in series.
[4] Outputs in parallel.

High current cable set for CP CB2
4 x 1.5 m with 95 mm^2 with plugs and clamps
1 x 0.6 m with 95 mm^2 for serialization of outputs
VEHK0610

Connection cable to CPC 100 for CP CB2
20 m, 3 x 2.5 mm^2
VEHK0611

Includes in option:

- CP CB2 Current Booster
- Connection cable to CPC 100
- High current cable set for CP CB2
- Grounding cable (same as for CPC 100 shown on page 22)
- Transport case (similar model as for CPC 100 shown on page 22, but with different inner shell)

CPC 100 Accessories

Cables, clamps and plugs (● supplied with CPC 100 Standard Package)

●

High current cable set (800 A, 70 mm²)

standard: 2 x 6 m VEHK0612
alternative: 2 x 9 m VEHK0617

●

High voltage cable set
(2000 V, screened, 0.5 mm²)
standard: 2 x 6 m VEHK0613
alternative: 2 x 10 m VEHK0618

●

Connection clamps for high voltage for connection with banana plugs 4 mm
VEHZ0610

●

Grounding cable (GR/YE) 1 x 6 m, 6 mm² with connection clamp
VEHK0615

●

Measurement cable set (2.5 mm²)

standard: 6 x 6 m VEHK0614
alternative: 6 x 10 m VEHK0619

Crocodile clamps for connection of banana plugs 4 x 4 mm VEHZ0620

●

Low voltage adapter VEHK0623
low voltage plug VEHS0610
for V2 AC low voltage level input (0-3 V)

●

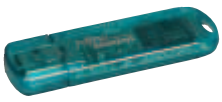
Power cord with:

open ends	VII connector	ZA connector	BS connector
VEHK0621	VEHK0616	VEHK0620	VEHK0624
(standard)	(alternative)	(alternative)	(alternative)

Current Clamp

Active ac and dc current probe with voltage output.

2 measuring ranges:	10 A and 80 A
Frequency range:	dc to 10 kHz
Accuracy:	error < 2 % for currents up to 40 A and frequencies up to 1 kHz
Phase error:	<0.5° at 50/60 Hz
Length:	230 mm (9.1")
Article Nr.:	VEHZ4000



●

USB memory stick

64 MB, Article Nr.: VEHZ0666
(symbol picture)

Transport cases

OMICRON offers sturdy transport cases with hard-form interiors. Recommended for heavy transport stress or for shipping.

Case model	For CPC 100	Carry bag for CPC 100 auxiliaries	For Current Booster CP CB2
Capacity	CPC 100, manual, power cord	Cable sets, current clamps	CP CB2, connection cable, high current cable set
Dimensions (L x H x D)	700 x 450 x 500 mm (27.6" x 17.7" x 19.7")	400 x 250 x 450 mm (15.7" x 9.8" x 17.7")	700 x 450 x 360 mm (27.7" x 17.7" x 14.2")
Weight	10.8 kg (23.8 lb.)	24 kg (52.8 lb.)	9.0 kg (19.8 lb.)
Article Nr.	VEHP0061	VEHP0069	VEHP0071

CPC 100 Package Options

PACKAGE OPTIONS

CPC 100 Package Overview

Item No.:	Description:	Packages[1]: CPC 100 – Standard, VE000611	CPC 100 – Enhanced, VE000621	CP TD1 (TanDelta) Test Set, VE000640	CP Transformer Test Set, VE000645
	CPC 100 – Multifunctional Primary Test System including hardware and built in software for testing of the CT's, VT's, power transformers, resistance etc. The basic system includes: • CPC 100 multifunctional test set hardware 110/230 V 50/60 Hz with AC 800 A; AC 2000 V; DC 400 A • QUICK test card (manual control of the test set) • Transport case with wheels for CPC 100 (VEHP0061) • Carry bag for CPC 100 accessories (VEHP0069)	✓	✓	✓	✓
VESM0610	**CP CT test cards:** ratio (V), ratio (I), excitation curve, burden, winding resistance, voltage withstand test (2 kV), Rogowski coils, Low power CT's	✓	✓		
VESM0615	**CP VT test cards:** ratio, burden, voltage withstand test (2 kV), electronic voltage transformers	✓	✓		
VESM0620	**CP Transformer test cards:** winding resistance, tap changer check, ratio, voltage withstand test (2 kV)	✓	✓		✓
VESM0625	**CP Resistance test cards:** contact resistance (μΩ…mΩ), winding resistance (μΩ…kΩ)	✓	✓		
VESM0630	**CP Ramping test card:** programmable ramping generator and determination of thresholds		✓		
VESM0635	**CP Sequencer test card:** sequencer test card for testing with different states		✓		✓
VESM0640	**CP GR - Ground resistance test option:** includes testing software + hardware accessory (VEHZ0660)		✓		
VESM0645	**CPOL:** polarity checking for CT/VT wiring including software + hardware accessory (VEHZ0650)		✓		
VESM0665	**CP TD1 test card:** capacitance and dissipation / power factor measurements			✓	✓
VESM0670	**CPC Editor Software:** for offline test preparation on a PC	✓	✓	✓	✓
VEHK0612	**High current cable set:** Standard: 2 x 6 m, 70 mm² (800 A)	✓	✓		✓
VEHK0617	Alternative: 2 x 9 m, 70 mm² (800 A)	❑	❑		
VEHK0613	**High voltage cable set** (2 kV, screened): Standard: 2 x 6 m, 0.5 mm²	✓	✓		✓
VEHK0618	Alternative: 2 x 10 m, 0.5 mm²	❑	❑		
VEHK0614	**Measurement cable set:** Standard: 6 x 6 m, 2.5 mm², 1 x 0.5 m, 2.5 mm²	✓	✓		✓
VEHK0619	Alternative: 6 x 10 m, 2.5 mm², 1 x 0.5 m, 2.5 mm²	❑	❑		
VEHZ0610	**High voltage clamps:** connection with banana plugs 4 mm (2 red+2 black)	✓	✓		✓
VEHZ0620	**Crocodile clamps** for connection of the banana plugs 4 mm (2 red + 2 black)	✓	✓		✓
VEHK0615	**Grounding cable** (GR/YE) 1 x 6 m; 6 mm² with connection clamp	✓	✓	✓	✓
VEHK0622	**Ethernet PC connection cable**, 3 m	✓	✓	✓	✓
VEHK0623	**Low voltage adapter:** 4 mm banana to low voltage plug	✓	✓		✓
VEHZ0666	**USB Memory stick** 64 MB	✓	✓	✓	✓
VESD0601	User manual	✓	✓	✓	✓
VESD0600	Reference manual (includded on the CPC Explorer CD-ROM)	✓	✓	✓	✓
VEHZ0665	**CP SA1 - Surge Arrestor Box** for 100 A winding resistance measurement from firmware v1.4 >	✓	✓		✓
VEHZ0644	**TH3631- Temperature / Humidity Measurement Unit** for humidity / ambient & surface temperature measurement				✓
	Power Cord	✓	✓	✓	✓
	VII connector for most of EU/M.East (VEHK0616) / ZA connector for South Africa, Namibia and India (VEHK0620)				
	BS connector for UK, Hong Kong etc. (VEHK0624) / C 19; 3 x 1.5 mm; 2.5 m, with open ends (VEHK0621)				
	Accessories				
VEHS0610	**Low voltage plug:** spare plug for low voltage input (0-3 V)				
VESM0660	**CP Amplifier test card:** for using the CPC 100 like an amplifier				
VEHZ4000	**Current Clamp:** 10 A / 80 A with voltage output				
VEHZ0650	**Polarity Tester (hardware only):** CPOL polarity tester, cover, batteries				
VEHZ0660	**Ground resistance accessory set:** 4 electrodes, 50 m cable reel red, 100 m cable reel black				
VEHZ0630	**CP CB2 - Current Booster up to 2000 A:** includes connection cable to CPC (VEHK0611), ground cable w/ clamp (VEHK0615), high current cable set w/ plugs & clamps (VEHK0610), including transport case with wheels (VEHP0071).				
VE000641	**CP TD1 - TanDelta / Power Factor Upgrade** includes: CP TD1 12 kV hardware w/ref capacitor + TanDelta test card, TD1 Accessories (cable drums w/ HV & Measure cables, 20 m) + Trolley; (eIFC card if needed - VEHZ0646)				
VEHZ0601	**CP TC12 - 12kV Test Cell** for measuring permittivity and TanDelta (Power Factor) of insulation liquids like tranformer oil				
VEHZ0602	**CP CR500 - Compensating Reactor** that includes two inductors rated 40 H each, 2 A compensation w/ inductors paralleled (500 nF)				
VEHZ0603	**CP CR500 - Compensating Reactor** set of **two** CP CR 500, compensation w/ units paralleled (1000 nF)				
VEHZ0671	**CP CU1 & CP GB1:** includes CP CU1 coupling unit w/ accessories for line impedance, k-factor, mutual coupling, ground impedance, step and touch voltage, and single cable coupling measurements. Includes CP GB1 grounding box (VEHZ0672).				

[1] Customized packages with individual combinations are available on request.

Current Transformer Testing

CT1
CT Analyzer

OMICRON's CT Analyzer is a unique lightweight multifunctional instrument designed to meet the highest standards for performing excitation, ratio, polarity and winding resistance tests on current transformers (CTs) as well as burden-impedance measurement.

The equipment provides automatic testing and calibration for all types of low leakage flux current transformers both on-site in the power system as well in the controlled environment of CT and switchgear manufacturers. The CT Analyzer allows an automatic assessment of test results clearly indicating whether the parameters of the CT under test match its specification. It is also applicable to the testing of CTs according to IEC 60044-6 (TPS, TPX, TPY and TPZ).

With the CT Analyzer the testing of current transformers can be carried out to an extremely high level of accuracy. The accuracy level (0.02 % / 1 min.) makes the CT Analyzer the ideal tool for calibration and verification, not only for protection CTs but also for class 0.2 CTs for metering.

Using the CT Analyzer provides a wide range of test and measurement possibilities:

- Burden measurement
- CT Winding resistance measurement
- CT Excitation characteristic recording
- CT transient behavior measurement
- CT ratio measurement with consideration of connected burden
- CT phase and polarity measurement
- Determination of accuracy limiting factor, instrument security factor, secondary time constant, remanence factor, knee point voltage/current, class, saturated and non saturated inductance
- Assessment according to defined standards: IEC60044-1, IEC60044-6, IEEE C57.13-1993

CT Analyzer - The unique analyzing solution for current transformers.
[European Patent EP 1 398 644 A1]

The CT Analyzer performs an automatic parameter search and CT test - using the "Name plate guesser" function. For standard current transformers it allows the user to do a test with minimal training and no knowledge of the CT to be tested.

The extremely small and lightweight (< 8 kg / 17 lb) hardware is particularly beneficial for on-site testing and the clear user interface utilizing clear electronically implemented "test cards", identified by labeled "tabs" makes the device very easy to use.

Technical Data CT Analyzer CT1

Generator / amplifier section

Output current	0 ... 5 A rms (15 A peak)
Output voltage	0 ... 120 V
Output power	0 ... 350 VA (1500 VA peak)

Ratio accuracy

For 0 VA up to rated power

ratio 1 ... 2000	0.02 %
ratio 2000 ... 5000	0.03 %
ratio 5000 ... 10000	0.05 %

Phase measurement

Resolution	0.1 min
Accuracy	1 min (for cos φ 0.8 ... 1)

Data transfer

Compact flash card to store test results and for transfer of data to a PC. Data can be read with a standard PC and the CPC explorer.

Standards

Safety	EN60950 and EN61010

Mechanical Data

Weight	8 kg / 17.4 lb (without accessories)
Dimensions (w × h × d)	360 x 285 x 145 mm / 9.2 x 7.2 x 3.7 in.

Ordering Information

VE000650	CT Analyzer standard package: CT Analyzer hardware, Compact Flash card 128 MB [VEHZ0654], USB compact flash card reader [VEHZ0655], power cord, reference manual and CPC Explorer, PC Software
VEHK0650	Accessories set for CT Analyzer: Coax cable set with banana plugs [VEHK0651] 2 connection clamps for primary side [VEHZ0652] Set of grounding cable [VEHK0615] Crocodile clamp set [VEHZ0656] 6 flexible terminal adapters Carry bag for CT Analyzer [VEHP0018]
VE000652	CT Analyzer standard package with Accessories CT Analyzer standard package [VE000650] Accessories set for CT Analyzer [VEHK0650]
VEHP0068	Transport case with wheels

For detailed information on the CT Analyzer please see our product information brochure "CT Analyzer - The Revolution in Current Transformer Testing".

Sweep Frequency Response Analyzer

FA1
FRAnalyzer

The *FRAnalyzer* detects defects in power transformer windings and faults in the magnetic core. After the transport of transformers to site and following through faults with high currents the frequency response test should be made to ensure that the windings were not damaged.

Unique features of FRAnalyzer:
- High reliability of results due to the applied measurement method and innovative connection technique
- Extremely small size through the use of leading edge technology
- Ease of use because of creative software
- Portability resulting from battery operation

For high frequencies the equivalent circuit diagram of a transformer winding can be drawn as a complex network of resistors, inductors and capacitors. The frequency response of this network is unique. It is like a fingerprint. Winding deformation causes one or more of the capacitors in this network to be changed. To identify these changes, which can be quite small, the new fingerprint is compared to that taken in a healthy condition. Deviations are an indicator of:

- Coil deformation - axial & radial
- Faulty core grounds
- Partial winding collapse
- Hoop buckling
- Broken or loosened clamps
- Shorted turns & open windings

Technical Data FRAnalyzer FA1

Frequency range	10 Hz to 20 MHz

Source Output

Output impedance	50 Ω
Connector	BNC
Wave form	Sine signal
Amplitude	0.01 to 1 V rms into 50 Ω

Inputs (Reference - CH1, Measurement - CH2)

Impedance	50 Ω
Impedance (high)*	1 MΩ // 60 pF
Connector	BNC
Input sensitivity	1V rms (full scale)
Input sensitivity*	100 mV rms (full scale)
Input attenuator	20 dB
Input attenuator*	0 dB, 10 dB, 20 dB, 30 dB, 40 dB
Receiver bandwidth	10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz
Dynamic range	> 90 dB
Dynamic range*	> 100 dB (at 10 Hz receiver bandwidth)
Gain error	< 0.1 dB (calibrated)
Phase error	< 0.5° (calibrated)

*using the network analyzer toolkit software

PC Software for
- operation of the FRAnalyzer
- diagnosis of the measuring results
- database handling
- vector network analyzer toolkit
- reporting

PC requirements

Interface	USB 1.1
PC operating system	Windows™ 2000 or Windows™ XP
Processor	Pentium™ 500 MHz or higher
Memory	256 MB RAM or higher
Drive	CD-ROM

Mechanical data / supply voltage

Weight	< 2 kg without measuring cables
Dimensions (w × h × d)	26 x 5 x 26.5 cm / 10.25 x 2 x 10.5 inch
DC power supply	DC 10 V to 24 V / 10 W

For detailed information on the FRAnalyzer please see our product information sheet "FRAnalyzer - Sweep Frequency Response Analyzer for Power Transformer Winding Diagnosis".

Micro Ohmmeter

CPM 500

- LIGHTWEIGHT: 7.5 KG / 16.5 LBS
- POWERFUL: UP TO 500 A DC
- TRUE DC CURRENT
- AUTOMATIC MEASURING
- UP TO 100 RESULTS CAN BE SAVED
- CPM 500 REMOTE CONTROL
- SELECTABLE USER INTERFACE LANGUAGE

Description

The CPM 500 is a completely electronic device that can be used for all Micro Ohmmeter applications from 10 to 500 A, like resistances of circuit breakers, disconnecting switches, high current busbar joints, cable splices, welding joints, or grounding connections.

The robust design makes the unit ideal for its use in high voltage substations and industrial environments.

The straightforward operation saves time both in training and actual testing. After the test current has been set, the automatic test procedure can be started by pressing the Ω button. The test result is displayed as R=V/I.

The CPM 500 uses advanced switch mode technology and generates true DC current with a stabilized output independent of the mains voltage. Automatic ramps eliminate magnetic transients. Up to 100 measurement results can be saved in the internal memory. All measurements are marked with the testing time and date.

A remote control unit with built-in sense connection allows starting and measuring the resistance directly at the test object. It indicates when the test is running and if the result has qualified as an acceptable test or not.

Technical Data

Power input	90 - 250V 50/60Hz
Test current range	10 - 500ADC
Resistance range	1 μΩ - 200 mΩ
Max resolution	0,1 μΩ
Accuracy	± (0.2% + 1 LSD)
Operating temperature	–10°C - +50°C / 14 F - 122 F
Weight	7.5 kg / 16.5 lbs
Dimensions	198 x 255 x 380 mm 78.0 x 100.4 x 149.6 in (W x H x D) without handle

Standard test cable set

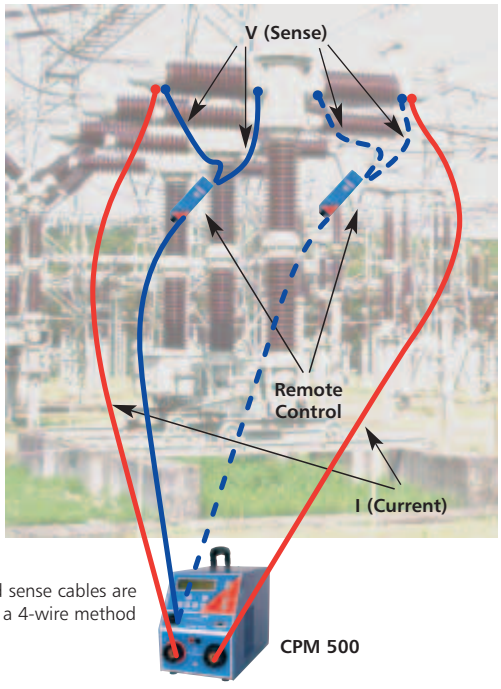
- Current cables 2 x 6m, 35mm^2 with battery clips
- Voltage sense cable set 2 x 6m with crocodile clips
- Mains power cable
- Ground cable

Further accessories: Visit the OMICRON website at www.omicron.at or www.omicronusa.com

CPM remote control for starting/stopping of tests

CPM remote control

Tests with multiple measurements can be started directly from the remote control. Connection to CPM 500: 6 pole XLR



Current and sense cables are connected using a 4-wire method

Worldwide

CONTACT ADDRESSES

North and South America

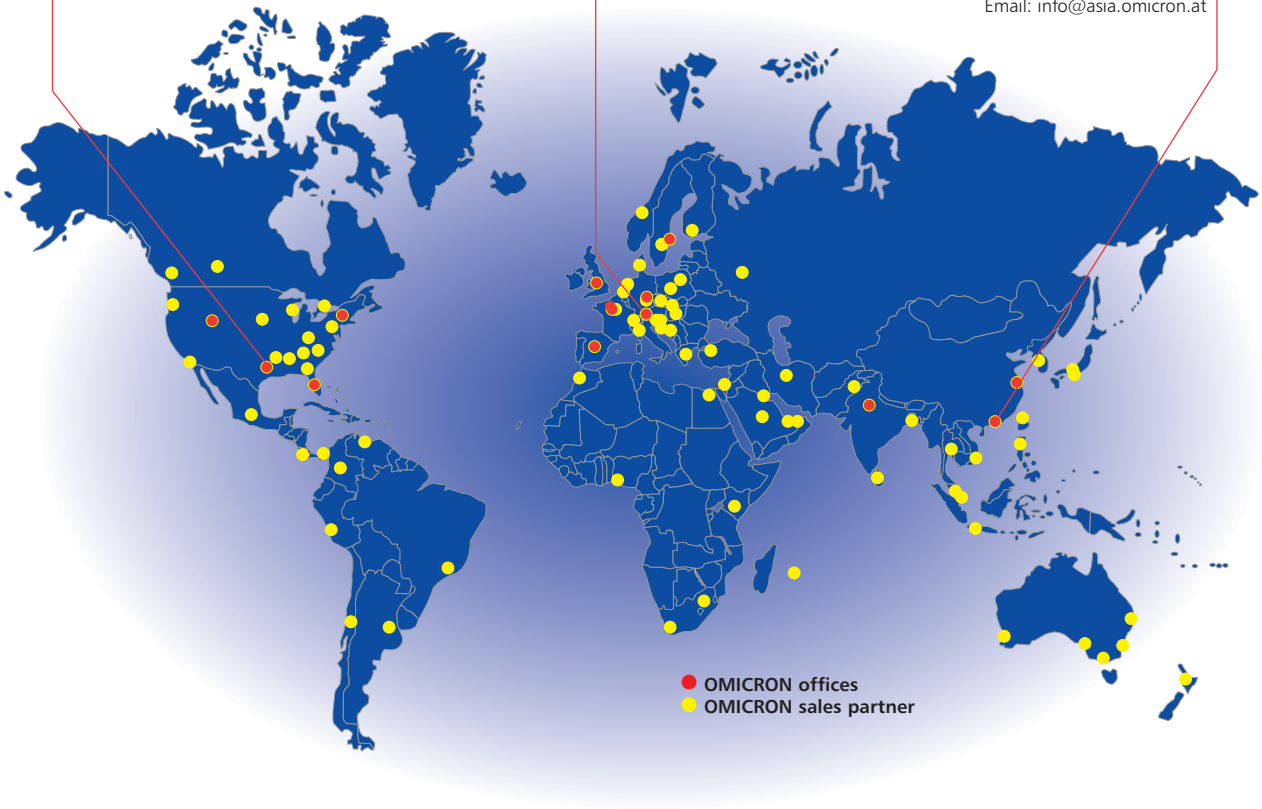
OMICRON electronics Corp. USA
12 Greenway Plaza, Suite 1510
Houston, TX 77046 / USA
Phone: +1 713 830-4660 or 1 800-OMICRON
Fax: +1 713 830-4661
Email: info@omicronusa.com

Europe/Africa/Middle East

OMICRON electronics GmbH
Oberes Ried 1
A-6833 Klaus / Austria
Phone: +43 5523 507-0
Fax: +43 5523 507-999
Email: info@omicron.at

Asia/Pacific

OMICRON electronics Asia Ltd.
Suite 2006, 20/F, Tower 2
The Gateway, Harbour City
Kowloon, Hong Kong S.A.R.
Phone: +852 2634 0377
Fax: +852 2634 0390
Email: info@asia.omicron.at



OMICRON has a worldwide customer base which continues to grow. Direct customer contact is essential in developing and building lasting relationships around the world. To achieve this, OMICRON has an extensive network of more than 50 representatives, distributors and local offices.
To identify the contact for your area please visit "Contact Us" on our website at

www.omicron.at or
www.omicronusa.com

OMICRON is an international company providing innovative power system testing solutions. With sales in more than 120 countries, offices in Europe, the North America, and Asia, and a worldwide network of sales partners, OMICRON has established a reputation as a supplier of leading edge technology.

OMICRON's automated primary and secondary testing capabilities are important benefits in light of the changing market conditions resulting in restructured organizations required to "do more with less". Services in the area of consulting, commissioning, testing, and training make the product range complete.

Specialization and visionary leadership allows OMICRON to continue with revolutionizing developments for its solutions to meet the customer needs of the 21st century.

OMICRON Sales Service Centers

Europe, Middle East, Africa
OMICRON electronics GmbH
Oberes Ried 1
A-6833 Klaus, Austria
Phone: +43 5523 507-0
Fax: +43 5523 507-999
info@omicron.at
www.omicron.at

Asia, Pacific
OMICRON electronics Asia Ltd.
Suite 2006, 20/F, Tower 2
The Gateway, Harbour City
Kowloon, Hong Kong S.A.R.
Phone: +852 2634 0377
Fax: +852 2634 0390
info@asia.omicron.at
www.omicron.at

North and South America
OMICRON electronics Corp. USA
12 Greenway Plaza, Suite 1510
Houston, TX 77046, USA
Phone: +1 713 830-4660
1 800-OMICRON
Fax: +1 713 830-4661
info@omicronusa.com
www.omicronusa.com

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